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Preventive Orthodontics for the General Practitioner*

L. B. HIGLEY, *Iowa City, Iowa*

Preventive orthodontics should include the prevention and correction of incipient deformity by elimination of the etiologic factors and by the application of simple interceptive or early remedial procedures. If this be true, then the dentist wishing to include such service in his practice must be able to: (1) Recognize incipient deformity; (2) Understand the etiology of deformity; (3) Institute preventive measures; and (4) Perform simple corrective measures.

Dento-facial deformity might be entirely abolished if, by knowing all the etiologic factors, their becoming active could be avoided. It is not that simple. All of the etiologic factors are not known; many are not or can not be detected until a deformity appears; some are practically unavoidable because inherited; certain of them become and remain active as the result of ignorance or indifference on the part of the patient, the parents, or both. Thus, incipient deformity does and probably always will occur regardless of the dentist's desire to practice prevention. However, occurrence of serious deformity can be minimized if the dentist has the ability to recognize incipient deformity.

Basic Knowledge Required to Recognize Incipient Deformity.—The ability to recoignize deformity is directly dependent on a knowledge of the normal individual. The term normal is to be interpreted as signifying the usual or expected. Most dento-facial deformities seen by the orthodontist are so advanced as to be easily recognized. Usually the parent brings the child because it is evident that something is wrong. Incipient deformity, however, is rarely noticed by the parent and is overlooked or misjudged by the dentist unless he is able to discriminate between deformity and a normal stage of development. Therefore, knowledge of the changes that occur with growth in the face and dental arches and of the stage of development expected for any given age and sex must be part of the equipment of every dentist who would practice any phase of orthodontics.

The following standards have been found to serve as a basis of comparison in evaluating certain stages of growth and development, and these are kept constantly at hand for reference and are of considerable value as aids to diagnosis.

1. From the work of Baldwin, Wood, and others, the height, weight, age

*Given with illustrations before the Thirteenth Annual Meeting of the American Society for the Promotion of Dentistry for Children in Milwaukee, Wisconsin, July 17, 1939. The reference material referred to in this paper is largely from "Dentistry for Children," by John C. Brauer, L. B. Higley, and Julian D. Boyd. P. Blakiston's Son & Co., Philadelphia. 1939.

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2. The Logan and Kronfeld revised chart on the Chronology of the Human Dentition which indicates the average state of development of a tooth for a given age based on histological findings.

3. Broadbent Bolton Standard of Calcification based on standardized roentgenographic findings.

4. Black's measurements of individual teeth. A child of average physical size whose teeth are considerably above average in their mesio-distal diameters will probably not have room for all the teeth. Again, teeth of one arch will not fit with those in the opposing arch if those of one arch are equal to or below average size, while those of the opposing arch are above average.

5. Stanton and Goldstein's average width in the alveolar arches cover a range from one to eleven years of age. Just how large the arches should be to allow perfect alignment of the teeth for those above this age might be computed from the actual size of the teeth in a given individual according to Pont's Index.

The individual intraoral radiograph may be compared with standards to decide whether the teeth have reached the stage of maturity expected at a given age. Thus the dental age of a patient can be determined. Both dental and bone age are more important in evaluating the development of an individual than chronological age. Therefore, the method used in Todd's *Atlas of Skeletal Maturation* is recommended for the determination of bone age. Any of these standards must be used with considerable judgement when applied to the individual patient or they will do more harm than good. In determining the presence or possibility of incipient deformity, the value of such diagnostic material cannot be under-estimated.

Dental or facial deformity is often progressive, and incipient deformity is so intimately related to etiology that it is difficult in many cases to separate the symptom from the cause even in a careful examination. The preventive orthodontist's most important service is to recognize factors leading to deformity and to remove them or minimize their effect. If incipient deformity is already present, it must be discovered, its progress stopped, and normal relations established if possible. For children, especially, the visual examination is worthless without the support of the radiograph to reveal the invisible. Since calcification of all except the third molar teeth is under way by the third year, it is advised that a full mouth X-ray survey be made on every patient not later than five and one-half years of age.

It is assumed in the following discussion of how to prevent or overcome deformity that denture guidance is the objective and not correction of deformity advanced beyond the incipient stage. The problem must be approached logically. Reasoned contemplation of what may happen under certain conditions will, in most cases, have to indicate what must be done,

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but it should be repeated that the only possible foundation for such logic must be a knowledge of the patterns of growth and what influence heredity and environment have on the final maturity.

Hereditary Deficient or Prominent Mandible.——When both the child's family history and facial contour indicate the possibility of a deficient or prominent chin, corrective exercises or habits should be instituted, and care should be given to avoid those that might increase the condition.

Purposeful exercises, such as whistling, playing a wind instrument the mouthpiece of which is held against the lips rather than inserted in the oral cavity, chinning on the horizontal bar, etc., through their stimulating effect may help to develop the mandible which tends to be deficient, while habits that produce a distal pressure on the lower jaw may increase the lack of development. For older patients a Hawley retainer, with an inclined plane, may be used to keep the lower jaw in the correct forward position. In the case of a prominent chin tendency, the patient must avoid protruding the chin. Such pressure stimuli as playing a wind instrument, the mouthpiece of which is inserted into the oral cavity, may produce some desirable effect on the mandible. In all such cases, the exercises advocated by Rogers are recommended. However, if the abnormality is already established, the case should be referred.

Hereditary or Congenitally Absent Teeth.—Missing teeth will be discovered early if full mouth X-ray surveys are taken not later than at five and one-half years. When so discovered, if denture collapse can be prevented, certain deciduous teeth may be removed early to allow the permanent tooth germs to drift mesially and close in the space. By this procedure, bridges and other artificial restorations may be avoided. When early X-rays are not taken, the fact that a permanent tooth is missing is often not discovered until after the time when this tooth would erupt if present.

If the deciduous tooth is still in place and the roots not resorbed, it may be retained as long as possible. Although they often serve until quite late in life, they do upset the occlusion, since their mesiodistal width is not the same as the permanent successors. Because of this and the fact that an artificial restoration will be needed when the deciduous tooth is lost, some advise removal of the deciduous tooth and the mechanical closure of the space by tooth movement.

Premature Loss of Dedicuous Teeth.—In general, when a deciduous tooth is lost early, a functional space maintainer should be placed. Where early multiple removal of deciduous teeth is necessary, the Hawley retainer or a lingual arch wire to support the arch, with spurs added to prevent tooth drifting may be used to advantage. Every dentist should be capable of constructing and installing a lingual arch wire to prevent arch collapse, maintain tooth position, and help guide erupting teeth into correct positions. To accomplish this, Willett overlays or contoured bands may be placed on the first permanent or deciduous molars. A 0.040 inch wire is adapted to lie

against the lingual surfaces of the teeth present, just free of the gum, connected to the bands with tubes, and held in place with a suitable lock. The spurs may be 0.020 inch wire. The state of development of the permanent successor as revealed by the X-ray should determine whether the deciduous tooth should be retained or removed.

Early Eruption of Permanent Teeth.—The permanent teeth may erupt early before the deciduous roots are resorbed or before the jaws have grown sufficiently to accommodate them. Parents are greatly disturbed when, for example, the lower permanent centrals begin to erupt lingual to the deciduous centrals. However, it is not always well to remove the deciduous teeth immediately, as it is believed that the pressure produced by the permanent teeth trying to wedge themselves ino position may serve to stimulate or speed up growth in this area. If the deciduous roots *are* resorbed, or if the position of the permanent centrals is not improved after a period of several months' observation, the deciduous centrals should be removed. In no case should more deciduous teeth be removed than there are permanent teeth erupted to take their place. When this condition is first noticed, it is well to take measurements and compare the arch development with the average for the age and sex of the patient. If the arches are found to be considerably below average, mechanical expansion by an orthodontist may be indicated but should not be carried out until measurements have been taken at intervals of about three months and no increase noted over a period of six to nine months. If, during this observation period, sufficient increase occurs to be measurable, the case may develop naturally. Where arches are very narrow, it is important to determine whether any pressure is being exerted that tends to narrow the face and prevent natural lateral growth.

Tardy Eruption of Permanent Teeth.—The radiograph should show, when a tooth fails to erupt, whether it is developed sufficiently or whether it is impacted. If eruption is prevented by a thin layer of bone or hardened tissue over the tooth crown, the removal of such tissues will generally result in speedy eruption of the delayed tooth.

Loss of Permanent Teeth.—If artificial restorations are desired because of loss of permanent teeth, and the X-ray shows the roots of abutment teeth are not fully formed, space may be maintained by using a modified Hawley retainer. Since it is claimed that bridge work might damage the teeth before completion of the root, other types of space maintainers would be objectionable for the same reason. However, roots continue to form even under orthodontic tooth movement, and there is little evidence to prove they would not do so under artificial restorations. It may be that in the future dentists will advise when a permanent tooth is lost before say twenty years of age that the teeth posterior to the space be carried forward to fill the vacancy and thus eliminate the need for an artificial restoration or space maintainer.

Supernumerary Teeth.—Early, full surveys of children's mouths will generally reveal supernumerary teeth so that they may be removed before

deformity results. Whether erupted or not, remove the tooth which is in the least favorable anatomic position if the two are equally well formed. It is usually best to remove extra teeth whenever found, since with unerupted ones there is the additional danger of cyst formation.

Inharmony of Tooth Size; What about Extraction?—If the teeth are too large for the predicted jaw and facial development, as a last resort extraction may be indicated to prevent jumbling. Consultation with an orthodontist is always advisable in such cases. Never extract a tooth in one arch in order to allow another to come into alignment. This makes the total mesio-distal tooth substance of the mutilated arch too small for the opposing one, the teeth of which must then overlap, as the larger arch always tends to reduce to the size of the smaller.

Abnormal Labium Frenum.—Never remove any part of even an abnormal frenum until it is evident that the laterals and cuspids will not carry the centrals into contact as they wedge themselves into position. The wedging of these teeth against the resistance of the frenum may be just the stimulation needed in this area to produce the expansion required for the six anterior teeth.

However, if the centrals remain separated as the laterals erupt, they may need to be carried together mechanically, using bands with brackets and a short segment of rectangular wire. The wire segment is made to conform to an equivalent portion of a symmetrical labial arch with the ends extending as far lingually as possible on the distal proximal surfaces of the centrals. The ends of the segment should be bent enough to reduce the distance between them about one-half millimeter. It is then sprung to place and secured with ligatures. Precious metal bracket bands may be secured from S. S. White or Baker and Company and those of steel from the Rocky Mountain Metal Products Company of Denver. Adjustments may be made at intervals of three or four weeks. If after the centrals are carried into contact and retained until the laterals erupt, they again tend to separate, because pressure atrophy has not stopped the activity of the frenum, they may be brought back into contact and a wedge of tissue removed from between them. As soon as the tissue is removed, the wire segment is again placed to keep the centrals in contact and to prevent excessive scar tissue from forming. Where the permanent laterals are missing and the frenum is enlarged, there is little chance of the centrals being carried together by natural means.

Impacted Teeth.—Through the use of the radiograph and the preventive measures previously discussed, the number of impacted teeth may be greatly reduced. When impaction does occur, two types may be treated successfully by the preventive dentist. In one type, approximating teeth drift into a space but may be easily moved back, because the distance to be moved is slight and there is room to move them. The clasps as on the Hawley retainer or the spurs as on the lingual arch wire may be activated slightly at

intervals of two or three weeks to open the space. The other type might include, for example, a molar erupting and getting caught under the crown of the tooth mesial to it. In such a case, this locked contact may be freed by passing a ligature wire around the point of contact and twisting the ends together to produce a slight separating force. A twenty-nine gauge wire may be used at the start, and as space develops, the size of the wire may gradually be increased.

Habits.—Unfortunately, by the time the child comes to the dentist, certain pernicious habits are often definitely established. Until parents can be made to realize the effect of these habits on the face and jaws and so pay more attention to prevention, the work of the dentist has to include devising means to break as well as to prevent the habits.

Since a habit is an unconsicous mental pattern, it seems only reasonable that use of a corrective device that will recall the act to the conscious mind and will upset the pattern by making the act impossible or ineffective should be a more logical procedure than an appeal to the ego or pride. To change a mental pattern, the performance of the act should be frustrated at each attempt rather than intermittently as is true with many devices or methods. Therefore, for habits that lend themselves to such treatment, the corrective device should be ever present but should be as inconspicuous and unobjectionable as possible and, if no result is obtained in a reasonable experimental period, it should be discarded.

Every dentist has received advertisements for wire thumb guards of various designs, aluminum mits, silver plated wire gauze mittens, and distasteful drugs, often highly recommended. Undoubtedly they prove effective in some cases. However, a more hygienic and constant reminder and one which interferes quite effectively with the sucking act is easily employed. The effective performance of the act depends upon suction being produced between the thumb or finger and the palate. When the thumb is held away from the palate, this suction is not produced and the act is ineffective. The appliance consists of Willett overlays covering the first or both deciduous molars on each side of the upper arch, with a single bar of 0.045 inch wire soldered to them so as to span the vault. This should clear the palate by about 3/16 inch in the mid-line. In place of the single bar, a framework suitable to the individual case may be used. Ordinarily, the reflex of raising the hand to the mouth will be gone in a few weeks, and the appliance may be removed. If the habit returns, the appliance may be recemented to place for a short time.

To overcome lower lip sucking several 0.022 inch wires may be soldered vertically to an upper lingual wire to follow the lingual contour of the centrals and then be bent lingually to end in short spurs that are just sufficiently sharp to irritate the lip when dragged over them in sucking. If this device interferes with occlusion, the centrals may be banded with similar spurs

soldered to their lingual surfaces. To prevent the tongue from being held between the upper and lower teeth or from being thrust between them in swallowing, a wire crib effect may be soldered vertically, either to a lower or upper lingual arch wire.

Mouth breathing is a habit that does not lend itself to constant devices for correction, but must depend largely on the cooperation of the child. Even after the nasal passages have been cleared of all obstruction, the habit of mouth breathing must still be broken if well established. Naturally, the most effective way to re-establish nasal breathing is to prevent air from entering the oral cavity. To do this, either the lips or the oral cavity must be closed. A celluloid strip or metal disc held between the lips not only necessitates their being closed but also makes the child conscious of their opening if the object drops. During sleeping hours especially, an effective device is a thin rubber membrane either cut or cast to fit over the labial and buccal surfaces of the teeth and gums included in the vestibule of the mouth. To make the membrane, an impression of the vestibule is taken with the teeth closed. This should extend to the posterior limits and above and below to the muco-buccal fold. Over a plaster case secured from the impression, sheet rubber is adapted, marked, removed, and cut to size. (The material may be obtained from the Garlock Packing Company of St. Louis. Garlock 22-gauge sheet rubber.) To carry out the cast method, which produces a more accurate fit, cover the cast with a thin even layer of wax (24 gauge) to which is attached a large sprue, and then box and pour a layer of plaster over the wax to form a mold. Eliminate the wax with boiling water. Cast by pouring level full of pure latex (liquid rubber) and let stand twelve hours. Robertson states that this rubber diaphragm has proved valuable as an anti-mouth-breather as well as a factor in clearing up habits such as tongue thrusting, lip biting, and thumb or finger sucking.

Remuneration.—A motto hanging in the office of a prominent attorney reads, "A lawyer's time and advice are his stock in trade." In preventive orthodontics, the time consumed in uncovering an incipient deformity and the advice given should, when based upon known biologic facts and sound judgment, be more important than mechanics and should be considered the stock in trade of the dentist practicing preventive orthodontics. Sound advice or a simple guiding device used early are more beneficial than the most skilled use of a complicated corrective appliance used later after the damage is done. However, part of the problem is to educate the public to appreciate prevention rather than correction. Once the public is convinced, patients will be willing to pay a reasonable fee for advice and denture guidance rather than the high fee the case would require later for correction.

Local Anesthesia—The Apparently Undiscovered, Unknown, and Unused Operative Aid in Children's Dentistry

J. N. GASAWAY

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Many reasons have been given for the undeniable inadequacy of both the quality and the quantity of dental services rendered children today. Gibson[1] summarizes them as: (1) lack of interest on the part of parents, (2) fear of dental operations on the part of children, (3) failure of schools and public health workers to educate parents and children, (4) failure of the dental profession to render dental health service to children, and (5) financial inability of most parents to provide adequate health services.

Limited space compels discussion of but one of these summarized reasons, the child's fear of dental operative procedures, an element directly within the control of the dental profession. Dread of dental ministrations is one of the greatest deterrent factors militating against more widespread utilization of dental measures for children and is a poignant factor in the production of good or poor dental work.

Do we have the means to control dental fear? Do we use it? Let's look into the matter.

The April, 1938, issue of the *Review of Dentistry for Children* reported a unanimous verdict in the affirmative from replies to the questionnaire, "Do you favor the routine use of conduction or infiltration anesthesia for cavity preparation for children?" From this and in view of the fact that most properly prepared cavities are painful and many children are nervous in the dental chair, the writer assumed that local anesthesia was being used widely in children's operative work. However, in subsequent discussion with many dentists who are serving children, including recent graduates of several dental schools, few of these dentists were found to be using this valuable aid in children's operative treatment, nor did their particular dental schools teach its technic and use to their graduating students. It is unfortunate that a question concerning the teaching and use of local anesthesia for children's cavity preparation was not included in the recent questionnaire mailed to the colleges by the Curriculum Survey Committee of the *American Society for the Promotion of Dentistry for Children.*

A review of the literature for the past six years and standard texts on the subjects of anesthesia, child management, and operative dentistry for children likewise discloses that local anesthesia is infrequently used and seldom advocated as an operative aid in children's work. The claim is not made that this has been a complete coverage of the literature, but the

little material found in 328 references can easily be grouped into three classifications: (1) Opposed to the use of local anesthesia for children, (2) Advocating local anesthesia in extractions for children, and (3) Advocating the use of local anesthesia in cavity preparation for children.

Opposition to the use of local anesthesia for children.—Mead[2] feels that children who will take a local anesthetic satisfactorily are the exception rather than the rule that with a child who has a dread of a general anesthetic or will listen to suggestions, it is often possible to use local very satisfactorily. Mead feels a necessity, usually, to administer nitrous oxide-oxygen to children under fourteen, while Hagan[3] places the age before local should be used at five years.

McBride[4] seems to believe that local should not be used before the age of eight, even for extractions. He states that infiltration has been the most used and abused of any anesthetic for children's extractions; that local anesthesia, judiciously used, has a large use in the practice of children's dentistry; that conduction has been used by a number of dentists with most gratifying results, although he has never used it, not because of prejudice or dislike but because he derives the same eventual success from the habitual employment of other anesthetics.

Easlick[5], as his reason for using a devitalizing paste for pulpotomy of deciduous molars when they present with vital exposed pulps, says, "However, the use of local or block anesthesia is quite upsetting to many small children, particularly the first time it is used, and it may therefore create a patient management problem."

Advocating local anesthesia in extractions for children. — In this group are Hagan[3] after five, McBride[4] after eight, and Mead[2] after fourteen years of age. Straubb[6] classes twenty-five percent of children as coming from homes where reason and sane living have fortified children to meet the issues of life with moral courage. These children, according to the writer, will usually respond to reason, and a competent operator who approaches them with confidence can use local anesthesia. Nevin[7] states that local anesthesia is very satisfactory for many surgical procedures during infancy, but after the child enters the second year, local anesthesia must give way to general anesthesia until the child reaches the tenth year. After that age, it can be used with cooperative children.

Advocating the use of local anesthesia in cavity preparation for children.—McBride[4] reports that Paul, of Toronto, has given some 7,500 conduction anesthetics both for operative work and extractions, to young children appearing in his school clinic and recommends its use very highly. McBride devotes several pages to Paul's technic. Adams[8] says, "Strange as it may seem, working for children is a pleasure when the child is tractable and the peri-dental injection is used," but he qualifies by adding, "if they have no fear of the needle." Brauer[9] feels that comparatively few children

need or require an anesthetic for cavity preparation. However, he feels that local has proved an aid for some highly nervous children and in deep seated cavities in young permanent teeth. Sweet[10], McFall[11], and Herman[12] do not hesitate to use local anesthesia for cavity preparation and extractions, regardless of the age of the child. These are the only references found which advocate the use of local anesthesia in cavity preparation for children. The dentists who answered the questionnaire in the REVIEW and are employing this valuable aid are either few in number or, if there are many, they certainly have not been widely advocating its use in the literature.

Practical Use of Local Anesthesia. — The value of the routine use of local anesthesia in cavity preparation cannot be over-emphasized. Its use contributes to successful child management more than any other remedy or procedure which can be suggested. During the past ten years, local anesthesia has been used with spectacular success by the Children's Fund of Michigan in its dental clinics throughout the State and in the City of Detroit. More than five hundred thousand (520,795) children of all ages have been given local anesthesia for extractions and cavity preparations during this time. More than a million fillings have been placed in the mouths of underprivileged children in Michigan; half of these cavity preparations (521,949) have been done under local anesthesia. So valuable has it proved that its use has become a routine procedure during the past several years.

Successful anesthesia promotes confidence and peace of mind for children. Further, it promotes better dentistry by permitting thorough cavity preparation in teeth which might otherwise be painful to a degree that the success of the operation is impaired. With local, proper cavity extension and complete decay removal are possible for every child, with the result that restorations are more nearly perfect, capable of greater service, and have longer life.

After local anesthesia became a routine procedure for all cavity preparations in our clinics, staff members reported that they were doing more and better work in less time and with much less effort on their part because they were not working under tension in an effort to control the children. Strain takes its toll of every dentist's nervous energy. What should this mean to a dentist in private practice? Better child management results in improved dental service, increased fees, wider reputation, greater success, a changed attitude toward children's dentistry, and less physical and nervous exhaustion for the dentist, all of which will result in more children being welcomed into more dental offices.

We complain today of the attitude of the laity, press, and the cartoonist, but have the teachers and leaders in children's dentistry done enough to teach children and parents that pain is unnecessary in operative work for children? Psychologists seem well agreed that the experiences of childhood largely determine the attitude, hopes, and fears of adults. Children can be reared with a totally different attitude toward the care of teeth and the importance

of regular periodic visits to the dental office only if the profession will learn to use local anesthesia to eliminate pain as a very essential aid to proper cavity preparation in children's teeth. The contention is not made that local anesthesia is the *only* requisite for child management, but that it is fundamental to the other procedures known and used in meeting this problem.

In ten years, the Children's Fund programs have shown that many of the beliefs and maxims concerning local anesthesia for children are folklore. The belief that "children will not willingly submit to the needle for they fear it more than the dental bur" has a basis, but the profession is wholly to blame, for the usual procedure has been for the dentist to apologize for the use of local for children, either by word of mouth, by hesitancy, or by a few minutes of silence and inactivity, followed by the abrupt statement, "I am going to pick you to put the tooth to sleep." Then a syringe is whisked out of hiding, with scarcely any preliminary preparation, and the child is asked to open his mouth wide while a hurried injection is made.

Most children today are familiar with hypodermic needles from processes of immunization in school health services. If the dentist will mentally (emotionally) prepare the child for the injection through concise, confident, and matter of fact explanation, at the same time making it plain from his bearing, attitude, and manner that this is a common everyday occurrence, most children will recognize that dentist as one who knows what he can do, and the fear of the injection vanishes. Pauses, indecision, uncertainty, and lack of confidence on the dentist's part are the basis for many dental office fears and objections of children.

Another fallacy, "needle insertion and the injection are too painful for children," has given rise to advocacy of nearly every known drug as a topical anesthetic before needle insertion. Contrary to what has been believed and written, we do not find a topical aid or premedication necessary in the use of local with children. Moderate finger pressure at the site of insertion for a few seconds before tissue sterilization, the use of small gauge, sharp needles with a fine bevel, coupled with a deft technique of needle entry, make for painless needle insertion. The entry site for a mandibular block injection is in an area of meager sensory nerve supply, hence, relatively painless. For the upper supraperiosteal infiltration injection, the lip retracted, the area of puncture at the muco-buccal fold freely exposed, the needle is permitted to glide in under the superficial mucous membrane very slowly. Most children will respond to this technic favorably if the dentist will talk encouragingly during the preliminary preparations and then praise the child the minute the mucosa is penetrated. For lack of a better term, this might be called a "Talk, Pick, Praise, Technique."

A slow, smooth, and deliberate movement of the needle through the tissue with a drop of the anesthetic solution deposited in advance of deep tissue penetration is reported by most children to be painless. In all maxillary injections the periosteum is very lightly contacted, the needle slightly retracted, and the injection made into the areolar tissue, not into the resistant

mucosa enveloping the tooth. Slow injection of the solution, allowing at least one minute for injection of one cubic centimeter of solution, causes less pain and produces better anesthesia.

A very common mistake is to "wait until the cavity preparation becomes painful before using local anesthesia." This defeates the purpose of anesthesia as a management aid because the child has been unnecessarily hurt before the remedy is applied.

The statement that use of local for cavity preparation "injures the pulp and the tooth cannot be filled the same day" is pure *hokum* in our experience. The danger of pulp injury from lack of response to sensation has been greatly exaggerated. The use of slow motor speed, of sharp inverted cone burrs to undermine the dento-enamel junction, the cutting off of the lines of communication to the pulp from that area, and the removal of overhang with sharp chisels, produce little heat or injury to the dental pulp. If we are so careless as to fill a tooth directly on an exposure or if we fail to respect and protect tissue, we are not dentists. In our program, the usual cavities are filled the day they are prepared. A cavity varnish is used for every tooth, and 95 percent of all cavities are cement based. A zinc oxide-eugenol base precedes a cement base in deep cavities; when this is used, the cavity varnish is omitted.

Mandibular Injections

Conduction anesthesia is used for all operations in the mandible since it produces profound anesthesia and the mandibular block injection can be made painlessly owing to the meager nerve supply at the point of needle entry. The mental block injection is not used for lower anterior teeth because it is difficult and painful to give and there is danger of injuring the mental nerve. Infiltration anesthesia is not used for the mandibular teeth since the bone covering the roots on the buccal aspect of the molars is usually so dense that the solution will not permeate sufficiently to anesthetize these teeth for cavity preparation.

Direct Method for the Inferior Alveolar Nerve Block. — With the ball of the index finger of the free hand, palpate the anterior border of the ramus of the mandible and note the small depression between the borders of the internal oblique line and the ptergo-mandibular ligament—the ptergo-mandibular triangle, approximately level with the occlusal plane of the lower molar teeth in a child seven years of age. Keep the ball of the finger in this depression, with the nail turned toward the median plane. Hold the syringe so that the barrel lies in the bicuspid region of the opposite side, and guided by the nail of the palpating index finger (nearer the inferior margin of the nail for younger children), introduce the needle with the bevel toward the periosteum until it lightly encounters the bone of the internal oblique line. Deposit a few drops of solution to anesthetize the lingual nerve and make the needle advancement painless. Withdraw the needle slightly, and

gently move the soft tissue and needle toward the median plane with the palpating index finger. As soon as the internal oblique line and the temporal tendon are cleared, swing the barrel of the syringe distally a trifle farther if possible and advance the needle carefully until it encounters the periosteum. Retract the needle very slightly and deposit one cubic centimeter of solution. When the needle does not encounter the periosteum after it has penetrated a depth of 1.5 to 2 cm., withdraw the needle and try again, keeping the barrel of the syringe as far distal as possible on the opposite side of the mouth. It is quite possible to advance past the ramus in a small child and into other structures beyond. When the periosteum is encountered, one has the assurance that he is not injecting into muscles or into structures outside the desired area.

On completion of the injection, caution the child against biting, pinching, or rubbing the anesthetized lip, cheek, or tongue. At the expiration of three minutes, inquire whether anesthesia has been secured. If symptoms are evidenced at this time, one can usually be assured of profound anesthesia. The child is re-cautioned not to injure the lip and other anesthetized structures.

The buccinator (long buccal) nerve block is used to supplement mandibular conduction for all extractions and cavity preparation involving the interproximal surfaces of the lower posterior teeth. This nerve supplies the tissues of the mandibular ridge and the cheek, buccal to the molars and bicuspids, so it must be anesthetized for painless placement of the matrix band and gingival wedge for compound cavities. The commonly employed infiltration injection into the muco-buccal fold below and opposite the tooth to be anesthetized has not proved effective in our hands. A true block injection is made on the buccal side of the ramus at a point on a level with the occlusal plane of the mandibular teeth, just buccal to the external oblique line. Here the needle is inserted about 2 mm. with the bevel toward the periosteum, the cheek being drawn upward and outward. Deposit 0.25 cc. of the solution beneath the mucous membrane. Sloman[13] excellently describes the anatomy of and the technique for blocking this nerve.

Maxillary Injections

Supra-periosteal infiltration anesthesia is used for cavity preparation in all upper teeth for children because the bone overlying the roots of upper teeth on the labial surface, especially in the region near the apex, is much thinner than is usually represented in text books and articles on local anesthesia. This thought has a basis in the work of Freeman[14]. The cancellous structure of the maxillary bone permits the solution to reach and to render insensible the nerves of both the outer and inner loops by means of an infiltration injection.

Supra-Periosteal Infiltration.—Retract the cheek or upper lip outward and downward. Insert the needle into the fold thus defined, with the bevel pointed toward the periosteum and slightly (1 mm.) outward from the bone

in the area of the tooth to be anesthetized. Advance the needle along the outside of the periosteum until the point of the needle is slightly past the apex of the root. Deposit 1 cc. of the solution slowly at this point, and after the needle is withdrawn, massage the tissue gently to facilitate absorption.

Upper permanent incisors, cuspids, and bicuspids require only one injection over the apex on the labial or buccal side of the tooth to be anesthetized. The upper first permanent molar requires two injections on the buccal aspect; one is made mesial to the apex of the mesio-buccal root and the other made distal to the apex of the disto-buccal root.

The same technique is employed for maxillary deciduous teeth but the anesthetic solution must be deposited at a point nearer the free margin of the gum than for upper permanent teeth, in order to keep the solution as near the apices of the deciduous teeth as possible. The distance this point will be above the free margin of the gum will depend upon the age of the child and the rate of resorption of the roots of the deciduous teeth. To render these injections less painful, surface anesthesia may be obtained by depositing a few drops of the anesthetic solution under the mucous membrane at the muco-buccal fold. The needle is withdraw and a second injection made near the apices of the deciduous teeth to be anesthetized.

A palatine infiltration injection lingual to the tooth to be anesthetized is required for cavity preparation. Anatomically, this supplementary injection does not seem indicated, but we have found it necessary in actual practice. Steinfelder[15] has observed that the nerves supplying the plate often penetrate sufficiently to reach the peridental membrane, from which structure nerve fibers may pass through the apical foramen, thus directly innervating the pulp of the tooth. There is also the possibility of innervation from branches of the anterior palatine nerve, as may be shown when preparing cavities in the posterior teeth.

The injection in the palate is made in the area of the tooth to be treated, the bevel of the needle being directed toward the periosteum at a point one-third to one-half the distance from the gingival border to the median line of the palate. This point is slightly past the apex of the root and the mucous membrane being less adherent here than near the gingival border, needle entry is less painful. The needle is inserted with the syringe directed from the opposite side of the arch. About 0.25 cc. of the solution may be deposited here easily and painlessly.

Armamentarium

Special equipment is not required to administer local anesthesia to children, but experience in giving locals to over half a million children has shown that the dentist has a more delicate touch when using an all-glass syringe held in a pen-fashion grasp, since the tactile sense is more highly developed in the finger tips. The dentist is thus able to feel better the encountering of muscle tissue or other dense structures. A glass syringe is

light, convenient to handle, and seems to have a less frightening effect upon children than does the cumbersome appearing carpule-type metal syringe. The 2 cc. glass syringe is the most convenient size for use with children.

Schimmell rustless steel needles, 25 gauge, one inch in length, are used for infiltration injections and one and five-eighths inch in length for mandibular block injections. The rustless needle has been proved by a "bend-break" test to be the strongest available on the market today.

Procaine tablets, one-third grain, containing 1/2500 grain epinephrine, are used to prepare a fresh solution each morning. The following outline for the preparation and use of anesthetic solution, use and care of syringes and needles, is compiled from the Children's Fund of Michigan "Manual of Clinic Procedure."

Preparation of 50 cc. solution containing procaine, 2 per cent; epinephrine, 1:50,000.—(1) Boil a graduate, a crucible (No. 400 Porcelain Pickle Pan, Buffalo Dental), and a sterling silver spoon for ten minutes. (2) Place 54 cc. of distilled water in the crucible, bring to a boil, and boil for three minutes with the crucible covered. (3) Using the sterile spoon, remove 50 procaine tablets from the bottle and add these to the boiled distilled water. Re-boil for 30 seconds with the crucible covered.

Use of Solution.—(1) Remove cover of the crucible and place the cover face up. (2) Fill the sterile syringe by inserting the sterile needle (not the hub of the syringe) in the solution and drawing back the plunger. (3) Place the filled syringe with the needle attached between the folds of a metaphen saturated gauze pack so that both needle and glass syringe are entirely covered. (Do not wipe the needle on a napkin or other object before injecting. Do not refill syringes for another injection without re-boiling the syringe and needle for ten minutes. Instead, use another sterile filled syringe. Fill the syringe with the anesthetic solution immediately upon its removal from the sterilizer.)

Precautions to be observed in the use of syringes and needles.—(1) Discard bent or corroded syringe needles at once. (2) Use a new batch of needles beginning Monday morning of each week. Discard all used dental needles on the last operating day of the week. (3) Make three inspections of syringe needles as follows: (a) A visual inspection before the injection is made; (b) A finger test after the injection to discover any gross defect in the needle; (c) Test the point with thumb and finger for barbed edge after each injection. (4) Separate the plunger from the barrel of all glass syringes and allow both to stand in vinegar over each week-end. This will remove deposits from the syringe and prevent excessive wear and leakage.

Summary

Fear of dental operations is one of the more important deterrent factors militating against a greater public utilization of dental treatment, particularly for children. Though the means of fear prevention lie largely within the

control of the dental profession, a perusal of the literature, contacts with dentists, and limited checking of dental training disclose that local anesthesia is a frequently unknown and little used operative aid in Children's Dentistry.

The routine use of local anesthesia in ministering to the dental needs of over 500,000 underprivileged Michigan children has contributed more to successful child management and the production of good operative treatment than any other procedure so far discovered. Contrary to general dental opinion, children react favorably to local anesthesia when skillfully used. The popular beliefs of the "non-users of local anesthesia" are refuted when put to test in a large number of cases in which adequate armamentarium and techniques for successful conduction and supra-periosteal anesthesia are used.

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Survey of Dental Schools*

From the 1939 Report of the College Curriculum Survey Committee of the American Society for the Promotion of Dentistry for Children

KENNETH A. EASLICK, *Chairman*

To obtain the opinions of the teachers of Children's Dentistry, questionnaires were mailed to the 44 schools in the United States and Canada. Of these 44 schools, 10 schools failed to reply, 32 schools filled out and returned the questionnaires, and two schools replied that their programs in Dentistry for Children were not sufficiently organized to fill out the questionnaire. The answers to the questionnaire, insofar as they applied to undergraduate instruction, were tabulated in the preceding issue of the REVIEW.

POSTGRADUATE INSTRUCTION

Answers indicating the extent and type of postgraduate instruction offered and the distribution of the time are contained in the following table:

Type of Instruction Offered	Number of Schools	Enrollment During Last Two Years	Percent of Time Devoted to Operating	Lectures on Materials and Technics	Lectures on Allied Subjects*
One-day	2	4	75	0	10
Weekly		2	56	11	11
Two-week		43	45	25	25
Course	3	0	70	20	10
		31	7	36	36
Semester	2	0	..	..	..
Course		0	..	..	..
Extension	2	23	0	20	0
Course		0	30—50	**	0

*—Anthropology, biochemistry, child psychology, embryology, health education, nutrition, pediatrics, physical diagnosis, prevention of malocclusion, public health.

**—Two hours per week.

Eight of nine replies agreed that the postgraduate student should have the same technical instruction in Children's Dentistry as the undergraduate student and should have, in addition, a "refresher" course in all materials and operative technics. One school questioned the first statement and one school disagreed on the second.

Nine answered the query "Do you feel that the development of a changed professional attitude toward practice for children is the largest

*Some of the 32 schools which returned a "questionnaire" did not answer every question. Data presented herein are based upon the number who answered the particular question.

problem in postgraduate teaching?" Yes, 6; no, 1; "Big factor, but perhaps not the major one," 1; "No, technic," 1.

GRADUATE INSTRUCTION

A. Two of 32 schools offer a Master's Degree in Children's Dentistry. Both offer the course through the Graduate Division of the University and have a thesis requirement.
One school requires 24-30 hours of graduate credit; the other, 24.
One school requires two semesters of resident time; the other, one year.
Work on a problem in Children's Dentistry is required by one; is not by the other.
Percent of course devoted to Children's Dentistry: 46; 50.
Degrees held by the teacher of graduate work: A.B., M.A., D.D.S., 1; M.S., D.D.S., 1.
Enrollment last two years: 4; 8.

B. Two of 32 schools offer a course for the Public Health Dentist. One school gives a Certificate of Public Health; both give the degree Master of Public Health; one gives Doctor of Public Health.
The one school which has a thesis requirement permits its completion in Dentistry.
One school requires 30 hours of graduate credit; the other has a course requirement only.
Percent of course devoted to Dentistry: 25; 40.
Percent of course devoted to Public Health: 75; 43 (and 17 percent to allied fields).
Enrollment for the last two school years: 3; 10.

In a recently published paper Siegal, Waugh, and Karshan* present the results of metabolic study of Eskimo children with and without caries. Balance experiments were carried on for from 2 to 4 days for each child. Subjects were chosen from three localities, and the caries group contained 11 and the caries-free group 12 children. The subjects ranged from 7 to 15 years in age. From data upon the children's retentions of calcium, phosphorus, and nitrogen, the authors state: "It is clear from the data that no correlation was found between the retentions of these elements and the presence or absence of dental caries in the children studied. Furthermore, the retentions of those with active caries fell within ranges of the caries-free children and those with inactive caries."

In their summary the authors state: ". . . The data reported in this paper also suggest that there is no basis for the view frequently held that the freedom from caries enjoyed by primitive people is due to a nutritional superiority of "natural" as compared with "civilized" diets."

*Siegel, E. H., L. M. Waugh, and M. Karshan: Dietary and Metabolic Studies of Eskimo Children With and Without Dental Caries, Am. J. Dis. Children 59:19, 1940 (Jan.).

Medico-Dental Symposium

Conducted by the Michigan Unit of the American Society for the Promotion of Dentistry for Children

At the fall meeting of the Michigan Unit of the A.S.P.D.C., several members of the medical profession participated in an interesting and instructive informal symposium. Some of the questions introduced by the dental members and answers by their guests are reproduced here.

What if any are the essential differences between symptoms manifested by a child with a congenital hypothyroid and one with an acquired hypothyroid?

R. L. Schaefer, M.D. (Endocrinologist): There are no essential differences between congenital hypothyroidism and early acquired infantile hypothyroidism. The thyroid's chief function during this period of life is tissue differentiation. With a total lack of function, then, there would be a vegetative existence precluding the child from progressing either mentally or physically. Therefore, one must familiarize himself with the general symptomatology of infantile hypothyroidism in order to detect this condition clinically. The symptoms of insufficiency can be elicited with a proper developmental history. A delay in simple developmental events, such as holding up the head, sitting, walking, talking, and delay in eruption and exfoliation of the deciduous teeth, is significant of the state of hypothyroidism. Confirmation of this can usually be obtained by simple x-ray procedure —namely, x-ray of the indicated joints for the child's specific age. A delay in the time of appearance of the various osseous centers is considered pathognomonic. This should be done at the earliest opportunity. If the mother is hypothyroid, an x-ray in the third trimester of pregnancy may reveal such a delay. Treatment of the mother will benefit the child. If it is suspected at birth or any time after, this x-ray study should be made immediately.

What symptoms can be detected by the dentist to indicate a malfunctioning of the endocrine glands?

Dr. Schaefer: This question covers the entire diagnostic field of endocrine medicine. One must be familiar with the normal physiology of the various endocrine glands and their effect upon the developing child before he is able to recognize signs and symptoms of abnormal physiology. Briefly, the answer to the first question summarizes the symptoms relating to the thyroid. In the field of the pituitary is found the lack or excess of statural growth and sexual development. Disturbed calcium metabolism, as evidenced by rickets, spasmophilia, and convulsions, refers to the parathyroids. Reversal or exaggeration of sex refers to the adrenals. Advance or delay in sex development can be confirmed, also, by roentgenographic study for osseous development. In delayed adolescence there is a delay in epiphyseal closure resulting in gigantism or, at least, a disparity in measurements. The lower

measurement (from the symphysis to the sole of the foot) exceeds the upper measurement (from the symphysis to the vertex of the head), and the span exceeds the total height. In the precocious adolescent there is an early epiphyseal closure resulting in a typical type of relative dwarfism.

Does medicine have any findings to show a simultaneous endocrine influence and a relationship between growth spurts and learning spurts—*i.e.*, ability to read?

Dr. Schaefer: Human growth is an extreme variable. There is no doubt that growth is influenced definitely by the function of the eosinophilic cell of the pituitary. If growth varies from time to time, it can be ascribed to the variance in function of this cell at different periods, in the event that all other growth influencing factors remain equal. Growth spurts are frequently common near and during the period of adolescence. The mental factor is more affected by thyroid function. It has been our experience that many children whose only sign of mental retardation is that of poor academic progress have a mild degree of masked hypothyroidism revealed only by basal metabolic studies. They are frequently aided by the administration of an adequate dose of thyroid extract. It is well known that the endocrine system is an inter-related one, but very often this interdependence cannot be explained in a logical, theoretic fashion.

Are there any types of malocclusion definitely traceable to malfunctioning of the endocrine glands? Is congenital absence of teeth apt to be caused by an endocrine disturbance?

Dr. Schaefer: In the same way that the endocrines display their effect upon general somatic development, their influence is noted in the development of the teeth and conformation of the facies, particularly that of the jaw. In the hypothyroid, the deciduous teeth are late in erupting and exfoliating, and they are frequently carious. The eruption of the second set is influenced by this late exfoliation, thereby causing, at least, misalignment. The hyperpituitary and hypergenital types have an early eruption and exfoliation with early appearance of the second set. In the pre-adolescent hyperpituitary giant, there is no great malocclusion such as is noted in the adult type of hyperpituitarism, or acromegaly, with the prognathic type of lower jaw. The hypogonad, or eunuchoidal type, presents a long, angular lower jaw. A frequent characteristic finding in this type is the relative prominence of the upper central incisors with small lateral incisors or absent lateral incisors.

What is the most desirable age for surgical correction of Hare-Lip, or Cleft-Palate?

W. A. Lange, M.D. (Plastic Surgeon): The most desirable age for correction of hare-lip is about the fifth or seventh day after birth, provided the baby is progressing normally. The baby then can begin nursing on the tenth post-operative day, and he is no longer a feeding problem. Of almost equal importance is the consideration of the parents. It is a calamity to have a child born with such a deformity, and if the parents have to display their

product as such, they are very embarrassed. An early correction will eliminate many heartaches.

Correction of a cleft-palate should not be done before the baby begins to talk. This age varies with individuals. Usually a child begins to talk at about eighteen to twenty-four months of life. Operative intervention earlier usually ends in disaster, and subsequent operations are necessary. A failure in the first attempt makes further surgery more difficult. It would be easier for the surgeon to wait until later in life. The structures would all be larger and stronger and consequently easier to manipulate. However, the child should learn to talk from the start with as nearly normal speech mechanism as possible. This will save re-learning to talk properly later. When a child begins to pronounce words, then a palatorrhaphy should be done.

Are moles contagious? Are there some types of moles which may be caused by repeated irritation—*i.e.*, thumb sucking?

Dr. Lange: Moles in the true sense of the term are not contagious. Warts, that is the common type known as verruca vulgarus, are contagious. They are frequently called "seed warts." There is no record of moles developing due to repeated irritation such as thumb sucking. Certain types of moles are present at birth. Others may be present at birth or may develop at any time during life. The latter type includes the vascular moles, "birth marks." The minute vessels are at fault, and they may develop on parts of the body where there is little or no irritation.

Is surgery ever a desirable solution or adjunct in the correction of malocclusion?

Dr. Lange: Surgery is definitely a desirable solution or adjunct in the correction of malocclusion. When we recall all the complications that may arise following bone surgery, including non-union and osteomyelitis, we will consider surgical intervention as a last resort. Until all other means for improvement, including Orthodontia, have been considered, surgical correction of lower jaw deformities should not be resorted to. Usually, then, only the extreme cases will have to be operated. These include marked receding and protruding mandibles and uni-lateral elongation and shortening.

What is the earliest age for corrective operations for mouth breathers with nasal obstruction?

Dr. Lange: The type of nasal obstruction determines the age at which corrective surgery should be done. Posterior and anterior imperforated nares must be operated on as early as possible after the child reaches a stage of being a good operative risk. Abundant adenoid tissue, if obstructing the posterior nares, should be removed early in childhood. The removal of such obstructions early in life will eliminate maldevelopment of the maxilla, the nose, and the mouth. The age for performing submucous resections to correct deviated septums and thus provide adequate airways is less now than a few years ago. Formerly, it was thought the individual should be 18 or 20

years old before such surgery should be attempted. The operative age has been gradually reduced. There is no genuine reason why the operation should not be performed at 10 or 12 years of age. One objection to operating at this earlier age is that the field is smaller and consequently the operator has more difficulty in obtaining good results. The skillful surgeon can overrule this objection. Another objection is the anesthesia necessary at this age. This argument, too, is not well founded. There is no real reason why the individual should have to breathe abnormally for several years when the cause can be eliminated. Those years are very important in their development, and every possible chance should be given for them to develop normally.

Do you believe that the premature loss of deciduous molars can lead to malnutrition?

E. O. Jodar, M.D. (Pediatrician): Malnutrition under these circumstances may be possible but certainly would be very unlikely because adequate food can be administered in a soft and even in a liquid diet to maintain good nutrition.

From the pediatrician's point of view, should thumbsucking be broken as early as possible?

Dr. Jodar: Thumbsucking should be *prevented* if possible, and if the habit has become established, every effort should be made to break it.

Is cutting of deciduous teeth ever the cause of true illness in babyhood?

Dr. Jodar: If by the term "illness" is meant "any deviation from the normal," then we must say that the cutting of deciduous teeth is sometimes the cause. However, when by the term illness, we mean something which can be measured by an elevation in temperature and other distinct symptoms and signs which can be found by physical or laboratory examination, then the cutting of teeth can only be considered a very minor factor in contributing to the cause of the illness.

What would you do with a healthy 17-month-old child who refuses to eat food in any form?

Dr. Jodar: After a careful examination to be certain that the child is not ill, I would then give him nothing but water until such time as he will eat. This can be more the problem of the mother than the child so the investigation would also be directed toward her.

Refined sugars are considered a potent factor in the etiology of dental caries. What substitutes would you suggest (1) for the infant, (2) for the juvenile?

Dr. Jodar: For the infant and young child, maltose and dextrin preparations, dark corn syrup, and honey would be substitutes for refined sugars. For the juvenile, plenty of out-of-door exercise would produce an appetite for any food; then fruits, dried as well as fresh (raisins, dates, peaches, apricots), corn and maple syrup, and honey would fill this need.

The Evaluation of Growth*

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The process of growth seems commonplace, yet many who work with children have little concept of its pattern, or of the manner in which growth can be affected favorably or adversely through environmental factors. Recognition of the problems peculiar to the child has given rise to the establishment of pediatrics, pedodontics, orthodontics, and child welfare as specialized fields of study and of service.

One does not have an instinctive knowledge of the pattern of growth, and unless trained to recognize deviations from the normal, he probably will overlook all but the most obvious departures from it. Growth represents not merely the addition of substance to the body it is an unfolding of the individual through successive phases and proportions until the adult form is attained. Normality must be defined in terms not only of body proportions, but also in terms of the genetic pattern, the age of the child, and the environment which has moulded him. Usually we think of growth in terms of the whole structure, whereas in fact the different regions and organs of the body each develop according to its own intrinsic tempo. The body proportions at any moment represent the composite resultants of the degree of growth of each part. The rate of growth in different organs may vary markedly, yet each follows a predictable sequence. The development of function follows the regional maturation of the tissues involved. Only through familiarity with the characteristics of regional and general growth can one interpret properly the status of growth or of function of a given child.

Growth continues from the period of conception through to adulthood. Certain qualitative phases of maturation may not be completed when adult proportions have been reached, requiring several years longer before the tissues reach their ultimate state. The more favorable the conditions for growth, the earlier full maturity may be attained.

Certain parts of the body mature earlier than others, and may even retrogress while other parts still are in the formative stage. The period of growth of the skeleton and of the muscles determines the time required for obvious growth. The central nervous system, however, is very precocious in its development, being essentially complete by the time the child is a year old. The thymus gland tends from the time of birth to retrogress as a functioning organ, possibly serving its main function during intrauterine life. Lymph tissue, characteristic of the period of childhood, tends to retrogress as adolescence is approached. Sex characteristics remain essentially latent throughout the period of early and mid-childhood, then with the approach of puberty

*Abstract of presentation before joint meeting of American Association of Public Health Dentists and American Society for Promotion of Dentistry for Children; Milwaukee, Wisconsin, July 17, 1939.

they develop abruptly toward the adult configuration. Behavior, the functional product of the body and its parts, requires a prolonged period for maturation. Emotional and intellectual maturity are not achieved as early as physical growth would indicate whereas there is much individual variation in this regard, many persons have not reached emotional maturity when they enter the fourth decade; some never attain it.

The examiner may encounter regional or generalized retardation of growth. Every orthodontist is familiar with the facial deformity due to arrested growth of the spheroid bone. Symmetrical retardation of growth resulting in dwarfism may not be detected unless the age and measurement of the subects are taken into consideration. Physical and mental maturation may not go hand in hand; whereas the mentally deficient adult may show his abnormality in his physique, quite often this is not true. Well-formed adults with the mentality of children may be found in any large cross section of population.

The rate of growth of the body as a whole is subjected to certain rhythms; part of these are characterstic of the process of growth in itself, whereas others are due to external factors acting through the environment. During intrauterine life the rate is proportionately much more rapid than at any time. Another phase of accelerated growth is seen as the child approaches puberty. These are spoken as manifestations of intrinsic rhythm in contradistinction to minor variations in rate of growth which are observable at different seasons of the year, or even at different hours of the day. There is sufficient evidence to establish that environment plays a significant role in the pattern and rate of growth; favorable conditions permit the body to measure up to its fullest capabilities, whereas unfavorable conditions may arrest the processes which are proceeding most rapidly at the time in question. On this basis, one may postulate that the rate of growth of the child, or the ultimate physique of the adult, reflects, in some measure at least, the favorable nature of the environment in which the person has lived. One is born with certain propensities for growth; although these cannot be exceeded, they may not be attained unless living conditions are fortunate. Probably each of us serves as a record of the compromise struck between what we could have been and what we actually have achieved. Moderate deviations are to be expected; racial characteristics will express themselves in the pattern of growth. However, we are not helpless in the prevention of deviations from normal growth as long as we can help prevent or can correct environmental conditions which cause harm or which interfere with the unfolding of the normal pattern of development.

We tend to accept short stature or deviation from normal weight in the adult as dependent on the genetic pattern. The wide range in height is accepted as normal, or even desirable. In view of the fact that under ideal conditions of nutrition and of living the population tends to be taller, it seems likely that shortness of stature may represent adverse living conditions, or what has been termed "misadventures in health."

Height-weight tables often are interpreted as representative of the desired physique. Such tables represent not ideals, but average measurements of large numbers of children, many of whom have lived in adversity. If instead of such measures one substitutes those made from children living under better conditions, the standard is appreciably greater. Whereas the child's inherent characteristics may prevent his achieving the average size at the given time, the examiner should not fall back on such a conclusion until he has excluded the possibility that correctable conditions are to blame.

If living conditions can modify the rate of growth, isn't it likely that they can exert other adverse effects on health? Many prevalent disturbances of health have been found associated with deficiencies in diet, even though on casual inspection of the widespread use of suboptimal diets in the nutritions of children, one cannot escape the conclusion that regional as well as general disturbances of growth may have a dietary origin.

In summary, we should consider the child not as a static organism but as one continuously changing due to the processes of growth. At certain times, regional or general growth may be affected adversely by an unfavorable environment. Probably most children are handicapped to some degree in this manner; suboptimal nutrition, chronic fatigue, recurrent infections and other abnormal conditions contribute to this status. It is important that all who work in the field of childhood should have familiarity with the nature of growth, its significance and pattern, and its amenability to improvement in quality and in degree.

Need for Improved Levels of Nutrition in Childhood*

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It is important that all who work with children should recognize the importance of good nutrition, what this comprises, the prevalence of poor nutritional practices, the effect of faulty diets on the level of the child's health and performance, and the manner in which suitable nutrition can be assured. Much of the current literature and advertising propaganda dealing with this subject leads to a state of mental confusion rather than to the establishment of the necessary knowledge for the reader. This abstract is written as an aid in the expression of current nutritional philosophy, rather than to convey detailed information.

Human nutritional needs are complex. Appetite and satiety cannot be

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accepted as guides to adequate intake. The danger of inadequacy is greater in the child than in the adult, because of the requirement for physical growth. Quantitative needs for various foodstuffs are not proportional to the age of the patient; the child needs larger amounts of certain foods than does the adult. The complete diet contributes a long list of substances which the body needs for normal function or development, and which it is unable to manufacture so as to meet these needs. With deprivation, the body will compensate in such a manner that the deficiency may not be apparent, yet the resultant state is less favorable than if the diet had been complete.

Various foodstuffs differ in the nature and amounts of these necessary components which they contain. Some are rich in one factor, some in another. Some foods may contain several essentials in noteworthy degree, whereas others commonly eaten contribute little to the body's needs aside from the least common denominator of all foods,—energy. From the degree of use of certain specific foodstuffs, a good gauge may be obtained as to the adequacy of the diet of the individual or of the community. This is especially true of the so-called protective foods,—those which are highest in their content of the necessary ingredients. These so-called protective foods include milk and its products, eggs, meats, vegetables and fruits, and cod liver oil or its equivalent. Diets high in these foods offer nutritional components in much greater amounts and completeness than is supplied by the diets prevalently used by many children in all economic, social and regional divisions of this country. An analysis of food consumption reveals that valuable foods are being crowded out of the child's diet through the overuse of starchy foods, highly milled cereals, and sweets, at the expense of milk, fruits and vegetables. Even those children who follow the better nutritional regimens frequently omit from their daily intake certain articles necessary to make the diet both qualitatively and quantitatively complete.

Clinical and experimental studies have shown that nutritional deficiencies may masquerade under a variety of perversions of health without necessarily leading to outright disease. Even the grossest evidence of malnutrition, expressed through inadequacy of height or weight, frequently is overlooked or is credited wrongly to some other cause. Constipation, tooth decay, anemia, increased susceptibility to infection, static deformities and other abnormalities can be laid at the door of incomplete diets. Correction of the diet through the addition of a rich supply of the necessary ingredients often leads not only to the arrest of these disturbances, but in addition to the development of a state of vigor which the child has not known previously.

From the current propaganda, the professional man or the parent tends to get a warped idea concerning proper nutrition. The advertiser would focus our attention on the preponderant importance of his product, with exclusion from consideration of other diet adjuncts of equal or of greater importance. The faddist would have us think in terms of harmful effect of certain foods or combinations of foods, even though nutritional science offers him no proof for his claims. It seems much more rational to consider

the diet in its entirety, without overemphasis on any factor or exclusion of any other. Naturally available foodstuffs can supply the child's normal nutritional needs in their entirety if they are chosen with insight; with the exception of cod liver oil or its equivalent, one can obtain all of these diet essentials from the grocer in a more desirable form than from the pharmacist. We have no good evidence that any foodstuff is directly harmful in itself. The highly refined cereals, starches and sugars injure the child not through their overuse, but because they may crowd from the diet the foods which are more valuable and essential for normal nutrition.

The following dietary regimen has been shown to be adequate for normal nutrition, and effective in the reduction of tooth decay and other abnormal conditions dependent on faulty food habits. It is recommended as a basic intake for the normal child, to be supplemented with other foods in accordance with the total energy needs of the child. The supplementary foods may consist of starches, cereal or sugar products, or may be drawn from the more protective foods if desired.

DIET INGREDIENTS TO BE INCLUDED IN THE CHILD'S DAILY INTAKE:

1 quart of milk,
1 or 2 eggs,
1 serving of lean meat, fish, liver or fowl,
2 large servings of vegetables, one of which may be eaten raw,
2 large servings of fruit, one of which should be eaten raw,
½ ounce of butter,
1 teaspoonful cod liver oil.
Other foods in amounts sufficient to satisfy the appetite, but in no instance as replacement for the foods specified.

TENNESSEE POST-GRADUATE SEMINAR

A fifteen weeks Post-Graduate Seminar in Children's Dentistry, sponsored by the Tennessee State Dental Association, and the Tennessee State Department of Health, has just been completed.

Five weeks were devoted to each of three districts for a total program duration of fifteen weeks. Each district was sub-divided into three district centers where the series of five lecture-clinics were held on Mondays, Wednesdays and Fridays respectively.

Each class period consisted of lectures from 10:00 A. M. until 12:00. Following a recess of one hour for luncheon the class assembled for open discussion and table clinics until 3:00 P. M. The remainder of the afternoon and the following morning were devoted to office consultation and chair demonstrations.

Dr. Ralph L. Ireland, Professor of Children's Dentistry at the University of Nebraska, College of Dentistry, was the Instructor for the course, and he was assisted by Dr. Walter J. Pelton, former Assistant Dental Surgeon of the United States Public Health Service.

A.S.P.D.C. News and Activities

From the President:

Cleveland, Ohio, will be our host for the next annual meeting of the American Society for the Promotion of Dentistry for Children, Monday, September 9, 1940. The Hotel Cleveland, ideally located about 100 yards from where the sections of the American Dental Association will meet, has been selected as headquarters. An exceptionally fine program has been planned by the program committee under the capable guidance of the chairman, Dr. E. L. Pettibone, a past-president of the A.S.P.D.C.

The morning session will be devoted to subjects of particular interest to our own members, and the plan is to have two men well known in the field of dentistry for children speak at this time. The afternoon session will be designed to provide mutual interest to members of the American Society for the Promotion of Dentistry for Children and the American Association of Public Health Dentists. A director from the Cleveland Child Health Association will address the meeting, and two other essayists are scheduled to speak on subjects that will be varied and interesting to both groups. The latter part of the afternoon session will be sponsored by the Ohio group, who plan to present clinics in all phases of dentistry.

We extend an invitation to all general practitioners in dentistry and particularly to those who are especially interested in "Promotion of Dentistry for Children" to attend our meeting and avail themselves of the opportunity for contact with information, colleagues, and events that will ever be stimulating toward the ideals of the Society.

From the Secretary:

In addition to the comprehensive plans for the annual meeting which are being developed under the direction of our President and the Chairman of the Local Arrangements Committee, the joint meeting of the Executive Council and the delegates from the State Units, scheduled for Sunday afternoon, will be another "first" for the 1940 meeting. The purpose of this meeting as stated in the revised Constitution and By-Laws is "for the discussion of various matters relating to the organization, work, program, and promotion of the various functions and activities of the State Units." The new Constitution and By-Laws, as adopted by the Society at Milwaukee, July 17, 1939, has been printed in booklet form and a copy is being sent to all members along with their 1940 membership card.

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Dr. Floyde E. Hogeboom has recently been elected as a member of the Board of Trustees of the College of Dentistry of the University of Southern California.

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Dr. Walter J. Pelton, Past Assistant Dental Surgeon of the U. S. Public

Health Service, recently conducted a series of Post-Graduate courses in Children's Dentistry in Kentucky. The course started the early part of February and continued for twelve weeks.

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Dr. Stanley C. Brown conducted in Maine a five-day refresher course in Children's Dentistry.

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Dr. Charles K. Beamer, newly elected Secretary of the Southern California Unit, reports that in appreciation of faithful service, the Southern California Unit presented a beautiful plaque to Dr. Elsie C. Schildwachter upon her recent retirement as President. At the meeting, January 24, Doctors Sanborn Brann and Ben Rabinovitch spoke on "Something New in Children's Dentistry." Officers elected for the following year were: Dr. Hugo M. Kulstad, President Dr. Rex R. Waggoner, Vice-President; Dr. Charles K. Beamer, Secretary-Treasurer; Drs. Louise Jung, Douglas Dyer, Katherine Green, and Ben Rabinovitch, Board Members; and Dr. K. I. Lewis, Program Chairman.

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Twenty-five new members has just been secured by the Minnesota Unit. While only a little over a year old, this Unit is setting a fast pace and is already well up among the leaders in membership. Many other units are also endeavoring to increase their membership, and it now appears that the membership list will reach an all time high by the time the Cleveland meeting rolls around.

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New officers of the Illinois Unit were elected at the February meeting: Dr. Carl Greenwald, President; Dr. George W. Teuscher, Vice-President; Dr. R. W. Scott, Secretary-Treasurer; Dr. Joseph S. Rzeszotarski, Member of the Board of Directors.

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The following letter recently was received from Dr. Frank Nicolai: "Through you, as secretary of our organization, I wish to thank our fellow members of the American Society for the Promotion of Dentistry for Children, for the pleasing and enthusiastic response given to the Committee's reprint, "Make Way for Even Teeth."

"As members of both the A.S.P.D.C. and A.S.C. are devoted to furthering such high aims and ideals, it is not at all surprising to see us working together so unanimously.

"I am enclosing a pamphlet, "Facts About Orthodontics for Health Workers," which has just been released. I hope you will find it both interesting and useful, as we are having about 100,000 printed."

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New officers of the Oregon Unit are: Dr. Henry G. Stoffel, President; Dr. Clyde Ryan, President-Elect; Dr. Gail Stender, Secretary-Treasurer. The Oregon Unit is again participating in the dental alumni meeting of the

North Pacific College of Dentistry. The following members are taking part: Dr. Henry Stoffel: "Orthodontic Penalties Due to Pedontic Neglects." Dr. Gail Stender: "Black Zinc Oxide." Dr. P. T. Meaney: "Lymphosarcoma in a Twelve-Year-Old Boy. Case of Anodontia." Dr. William R. Price: "Pedodontic Reference Books. Membership Table." Dr. R. M. Erwin, Jr.: "Cast Space Maintainers."

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Dr. Richard C. Mears is acting as Secretary of the Pennsylvania Unit in the absence of Dr. B. Elizabeth Beatty. Dr. Beatty has been ill since November 9, but according to recent reports is well on the road to recovery.

BOOK REVIEW

Just prior to the National Meeting in Milwaukee last year Bakiston Son & Co., book publishers, announced a new book on Dentistry for Children, written by John C. Brauer. This belated review comes with no lack of respect for the text or the author but because the last issue of our journal could not accommodate any more material.

Perhaps, "it ain't the way you heard it" but Brauer's text is a real treatise on Children's Dentistry. Because of his background of study and his tenure of teaching, which includes an instructorship at the University of Nebraska and professorships at the Atlanta Southern Dental College and the University of Iowa, the material included has been tried and found useful The book, totally devoid of theory, has been written from a practical teaching angle In it are numerous distinct expressions and Brauerisms that seem literally to pop off the page at you.

The chapters in the book include the following, each of which contains a very thorough discussion of the question as well as the author's treatment of it:

Preventive Dentistry and Oral Prophylaxis
The Growth and Development of the Teeth
The Management of the Child
Examination and Diagnosis
Operative Dentistry for Children
Pulp Management, Deciduous Teeth and First Permanent Molars
The Treatment and Restoration of Fractured Permanent and Deciduous Anterior Teeth
Space Retention in the Deciduous and Permanent Arches
Preventive Orthodontics
Minor Oral Surgery Procedures for Children
The Normal Child
Principles of Nutrition
The Nature of Disease During Childhood

The chapter on Preventive Orthodontics was written by L B. Higley, Professor and Head of the Department of Orthodontics at the University

of Iowa. The chapters entitled, "The Normal Child," "Principles of Nutrition," and "The Nature of Disease during Childhood" were written by Julian Boyd, associate professor of Pediatrics, also of the University of Iowa. Both of these very able authors have made splendid contributions to the book.

Quite amazing in the text is the author's respect for those opinions of his conferees which he may have conscripted or utilized in part, for following each chapter is an extensive bibliography including, in some instances, as many as forty references. A thorough course in the subject matter may be obtained from his reference sheets alone, much less the data which he has so ably presented.

On any dental reference shelf, whether the reader practices Children's Dentistry entirely or in part, or is a teacher, research worker, or an individual only interested in preventive dentistry generally, this book is an asset. I'm certain the author does not expect agreement with the text in its entirety, his aim being to portray the general principles incident to dental work with children in a simple attractive fashion in the hope of encouraging better dentistry for children. —W. C. McBride.

The New York State Department of Health is sponsoring a series of one-week refresher courses in children's dentistry. These courses which will be conducted at the Guggenheim Dental Clinic in New York City and at the Eastman Dental Dispensary in Rochester, are intended to provide the postgraduate student with some modern conceptions of child psychology and child management, a review of the current theories of the etiology of dental caries, cavity preparation and filling materials for deciduous teeth, traumatic occlusion, prophylactic orthodontia, diet and dental health, dendistry and public health, local and general anaesthesia for children and dental diseases in children. Ample opportunity will be provided for the postgraduate student to carry out the operative procedures associated with children's dentistry on the preschool children in the clinics.

The State Department of Health has made available funds for training professional personnel in the newer teachings and broader concepts of public health methods. Inasmuch as dentistry is an integral part of the healing art, and the children's dentistry program an important factor in improving the standards of health for the citizens of our State, limited funds have been made available to pay the tuition fee and a stipend of $25.00 towards railroad fare and living expenses while away from home, for those dentists taking the course. These courses are intended for dentists practising in the small urban and rural areas, where opportunities for attending clinics and postgraduate courses are not readily available.

The first three courses scheduled are to be conducted at the Guggenheim Dental Clinic in New York City during the weeks of May 20, June 3 and June 17, 1940. Classes will be limited to 14 men so that each student will get as much individual instruction as possible. More courses will be scheduled as the demands warrant, and within the limits of available funds.